IN THE CLAIMS:

The following is a complete listing of the claims pending in the present application:

1. (Currently amended) A clinical fluid pumping system comprising:

a first pump that is configurable to pump a first metered amount of a first fluid through a first delivery line to a catheter;

a second pump that is configurable to pump a second metered amount of a second fluid through a second delivery line, separate from said first delivery line, to said catheter;

a processor, connected to control said first and said second pumps such that said second metered amount has a definable relationship to said first metered amount;

wherein said first delivery line and said second delivery line are separate lumen within a single tubing, and wherein the lumen of said first delivery line and the lumen of said second delivery line remain separate up to a connection point of said first and second delivery lines to said catheter.

2. (Original) The clinical fluid pumping system of Claim 1, wherein the first fluid is an oxygen-carrying solution.

3. (Original) The clinical fluid pumping system of Claim 1, wherein the first fluid is blood.

4. (Original) The clinical fluid pumping system of Claim 1, wherein the first fluid comprises blood from the patient.

5. (Original) The clinical fluid pumping system of Claim 1, wherein the second fluid is adenosine.

6. (Original) The clinical fluid pumping system of Claim 1, further comprising a plurality of additional pumps pumping respective fluids under the control of said processor.

7. (Original) The clinical fluid pumping system of Claim 1, wherein said first pump is further configurable to combine a third metered amount of a third fluid with the first fluid and to pump both the first and the third fluids into said first delivery line.

8. (Original) The clinical fluid pumping system of Claim 1, wherein the fluids are delivered at a controlled temperature and pressure.

9. (Original) The clinical fluid pumping system of Claim 1, wherein said processor receives feedback from monitors and can automatically alter operational parameters to meet predefined objectives.

10. (Original) The clinical fluid pumping system of Claim 1, wherein an operator can alter the definable relationship between said first metered amount and said second metered amount.

11. (Original) The clinical fluid pumping system of Claim 1, wherein the second delivery line contains a one-way check valve to prevent retrograde flow.

12. (Original) The clinical fluid pumping system of Claim 1, further comprising a temperature controller, configurable to provide heating or cooling to fluids in at least one of said first delivery tube and said second delivery line without contaminating the fluids.

13. (Original) The clinical fluid pumping system of Claim 1, further comprising a monitor to detect one or more conditions, the conditions including the rate of flow, the temperature, the pressure, and the concentration of a fluid within said pumping system.

14. (Original) The clinical fluid pumping system of Claim 1, further comprising a monitor to detect the temperature or blood pressure of a patient coupled to said pumping system.

15. (Original) The clinical fluid pumping system of Claim 1, wherein said processor is connected to control the activity of a portion of said clinical fluid pumping system.

16. (Original) The clinical fluid pumping system of Claim 15, wherein said processor is connected to control the operation of a valve.

17. (Original) The clinical fluid pumping system of Claim 15, wherein said processor is connected to control the speed of said first pump.

18. (Original) The clinical fluid pumping system of Claim 1, wherein said processor is connected to receive inputs from a monitor and to send signals to control a portion of said clinical fluid pumping system.

19. (Original) The clinical fluid pumping system of Claim 1, further comprising a display and control panel connected to provide information regarding the operation of said pumping system to a user and to accept input from the user.

20. (Cancled)

21. (Canceled)

22. (Original) The clinical fluid pumping system of Claim 1, wherein the second fluid is co-mingled with the first fluid no further from a target organ than 12 inches.

23. (Original) The clinical fluid pumping system of Claim 1, wherein said catheter is directly inserted into a circulatory vessel serving a target organ and has a single lumen.

24. (Original) The clinical fluid pumping system of Claim 1, wherein said catheter is inserted into a circulatory vessel remote from a target organ and maneuvered to the target organ, said catheter having multiple lumen.

25. (Currently amended) A clinical fluid pumping system, comprising:

a first delivery line for receiving a first fluid;

a second delivery line for receiving a second fluid; and

pumping means connected to advancing the first and second fluids through their respective said delivery lines in a known relationship to each other;

wherein said first delivery line and said second delivery line are separate lumen of a single tubing, and wherein said first delivery line and said second delivery line prevent the co-mingling of the first fluid and the second fluid up to a connection point of said first and second delivery lines to a catheter.

26. (Original) The clinical fluid pumping system of Claim 25, wherein said pumping means consists of a first pump.

27. (Original) The clinical fluid pumping system of Claim 25, wherein said pumping means comprises a first pump and a second pump.

28. (Original) The clinical fluid pumping system of Claim 25, wherein the co-mingling of the first fluid and the second fluid is delayed to prevent degradation of the second fluid.

29. (Original) The clinical fluid pumping system of Claim 25, further comprising a heat exchanger that is connected to provide heating or cooling to the fluids in said first and second delivery lines without contaminating the fluids.

30. (Original) The clinical fluid pumping system of Claim 25, further comprising means to control the fluid flow rate.

31. (Original) The clinical fluid pumping system of Claim 25, further comprising a means to control the known relationship between the first and the second fluids.

32. (Original) The clinical fluid pumping system of Claim 25, further comprising a monitor to detect the temperature or pressure of the fluid within said pumping system

33. (Original) The clinical fluid pumping system of Claim 25, further comprising a monitor to detect the temperature or blood pressure of a patient coupled to said pumping system.

34. (Original) The clinical fluid pumping system of Claim 25, further comprising a processor connected to control the activity of a portion of said clinical fluid pumping system.

35. (Original) The clinical fluid pumping system of Claim 34, wherein said processor is connected to control the operation of a valve.

36. (Original) The clinical fluid pumping system of Claim 34, wherein said processor is connected to control the speed of said first pump.

37. (Original) The clinical fluid pumping system of Claim 25, further comprising a processor connected to receive inputs from a monitor and to send signals to control a portion of said clinical fluid pumping system.

38. (Original) The clinical fluid pumping system of Claim 25, further comprising a display and control panel connected to provide information regarding the operation of said pumping system to a user and to accept input from the user.

39. (Original) The clinical fluid pumping system of Claim 25, wherein the first fluid comprises blood and the second fluid comprises adenosine.

40. (Canceled)

41. (Original) The clinical fluid pumping system of Claim 25, wherein the second fluid is co-mingled with the first fluid no further from the delivery site on the patient than 12 inches.

42. (Currently amended) A method of providing a therapeutic agent to a targeted portion of the vascular system of a patient, said method comprising the steps of:

providing a fluid pumping system;

receiving a supply of a first fluid into said fluid pumping system;

pumping the first fluid at a measured rate to a first delivery line attached to a catheter; and

metering a given amount of a second fluid to a second delivery line for delivery to said catheter, wherein the second fluid is delivered at a rate that is tied to the delivery rate of the first fluid;

wherein said first delivery line and said second delivery line are separate lumen of a single tubing, and wherein the first fluid in said first delivery line and the second fluid in said second delivery line are not co-mingled at least until delivery into said catheter.

43. (Original) The method of Claim 42, further comprising the step of:

passing at least one of the fluids through a heat exchanger, whereby the at least one of the fluids is brought to a desired temperature prior to delivery to said catheter.

44. (Original) The method of Claim 42, further comprising the step of:

monitoring the temperature or pressure of a fluid within said fluid pumping system.

45. (Original) The method of Claim 42, further comprising the step of:

attaching a monitor to detect the temperature or blood pressure of a patient connected to said pumping system.

46. (Original) The method of Claim 42, further comprising the step of:

using a processor to control the activity of a portion of said fluid pumping system.

47. (Original) The method of Claim 46, wherein said processor controls a valve.

48. (Original) The method of Claim 46, wherein said processor controls the speed of a first pump in said pumping system.

49. (Original) The method of Claim 46, wherein said processor receives inputs from a monitor and automatically controls a portion of said fluid pumping system.

50. (Original) The method of Claim 42, further comprising the step of:

providing information regarding the operation of said pumping system to a display and accepting input from a user.

51. (Original) The method of Claim 42, wherein said receiving step receives a fluid comprising blood and said pumping step pumps adenosine.

52. (Original) The method of Claim 42, wherein said catheter is directly inserted into a circulatory vessel serving a target organ and has a single lumen.

53. (Original) The method of Claim 42, wherein said catheter is inserted into a circulatory vessel remote from a target organ and maneuvered to the target organ, said catheter having multiple lumen.

54. (Original) The method of Claim 42, wherein the second fluid is co-mingled with the first fluid no further from a target organ than 12 inches.

55. (Original) The method of Claim 42, further comprising at least one additional pump to pump a predetermined amount of a third fluid into said first delivery line.

56. (Original) The method of Claim 42, wherein the fluids are delivered at a controlled temperature and pressure.

57. (Original) The method of Claim 42, wherein an operator can alter the relationship between the delivery rate of the first fluid and the delivery rate of the second fluid.

58. (Original) The method of Claim 42, further comprising the step of providing a check valve in sad second delivery line to prevent retrograde flow of fluids in said second delivery line.